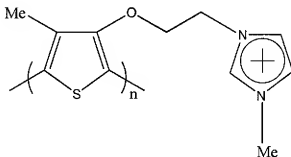


### AMENDMENTS TO THE CLAIMS

1. (Currently amended) An optical sensor for detecting a quadruplex G-quartet structure of a target bound by a single stranded aptamer complementary to said target, the optical sensor comprising:

a the single-stranded aptamer complementary to said target; and  
a water-soluble cationic polythiophene derivative of the following formula:



wherein "n" is an integer ranging from 6 to 100, and

wherein the said target is selected from the group consisting of potassium ions, small organic molecules, amino acids, proteins, whole cells and nucleotides.

2. (Cancelled)

3. (Cancelled)

4. (Previously presented) The optical sensor of claim 1, wherein said aptamer is single-stranded DNA.

5. (Withdrawn) The optical sensor of claim 4, wherein said single-stranded DNA has the following sequence:

5'-GGTTGGTGTGGTTGG-3' (SEQ ID NO 1).

6. (Withdrawn) The optical sensor of claim 5, wherein said target is human  $\alpha$ -thrombin.

7. (Previously presented) The optical sensor of claim 4, wherein said single-stranded DNA has the following sequence:

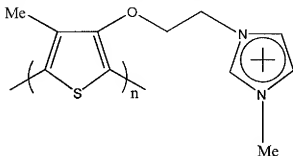
5'-ATTATACCTGGGGGAGTATTGCGGAGGAAGGTATAAT-3' (SEQ ID NO 3).

8. (Previously presented) The optical sensor of claim 7, wherein said target is D-adenosine.

9. (Withdrawn – currently amended) A method for detecting a quadruplex G-quartet structure of a target bound by a single stranded aptamer complementary to said target comprising the steps of:

a) contacting a sample suspected of containing the target with an optical sensor, said optical sensor comprising:

~~a~~the single-stranded aptamer complementary to said target; and  
a water soluble cationic polythiophene derivative of the following formula:



wherein “n” is an integer ranging from 6 to 100; and

b) detecting binding of the aptamer to the target by detecting whether the quadruplex G-quartet structure has been formed by measuring an optical signal.

10. (Withdrawn) The method of claim 9, wherein said optical signal is a UV-Visible absorption or fluorescence spectrum.

11. (Withdrawn) The method of claim 10, wherein said target is selected from the group consisting of potassium ions, small organic molecules, amino acids, proteins, whole cells and nucleotides.

12. (Withdrawn) The method of claim 10, wherein said aptamer is an oligonucleotide.

13. (Withdrawn) The method of claim 12, wherein said oligonucleotide is single-stranded DNA.

14. (Withdrawn) The method of claim 13, wherein said single-stranded DNA has the following sequence:

5'-GGTTGGTGTGGTTGG-3' (SEQ ID NO 1).

15. (Withdrawn) The method of claim 14, wherein said target is human  $\alpha$ -thrombin.

16. (Withdrawn) The method of claim 13, wherein said single-stranded DNA has the following sequence:

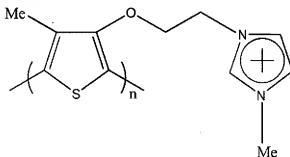
5'-ATTATACCTGGGGGAGTATTGCGGAGGAAGGTATAAT-3' (SEQ ID NO 3).

17. (Withdrawn) The method of claim 16, wherein said target is D-adenosine.

18. (Withdrawn – currently amended) A method for detecting a quadruplex G-quartet structure of a target bound by a single stranded aptamer complementary to said target comprising the steps of:

a) contacting a sample suspected of containing the target with ~~an~~ said single stranded aptamer known to be complementary to the target;

b) further contacting the sample with a water-soluble cationic polythiophene derivative of formula:



wherein "n" is an integer ranging from 6 to 100; and

c) detecting binding of the aptamer to the target by detecting whether the quadruplex G-quartet structure has been formed by measuring an optical signal.

19. (Withdrawn) The method of claim 18, wherein said optical signal is a UV-Visible absorption or fluorescence spectrum.

20. (Withdrawn) The method of claim 19, wherein said target is selected from the group consisting of potassium ions, small organic molecules, amino acids, proteins, whole cells and nucleotides.

21. (Withdrawn) The method of claim 19, wherein said aptamer is an oligonucleotide.

22. (Withdrawn) The method of claim 21, wherein said oligonucleotide is single-stranded DNA.

23. (Withdrawn) The method of claim 22, wherein said single-stranded DNA has the following sequence:

5'-GGTTGGTGTGGTTGG-3' (SEQ ID NO 1).

24. (Withdrawn) The method of claim 23, wherein said target is human  $\alpha$ -thrombin.

25. (Withdrawn) The method of claim 22, wherein said single-stranded DNA has the following sequence:

5'-ATTATACCTGGGGGAGTATTGCGGAGGAAGGTATAAT-3' (SEQ ID NO 3).

26. (Withdrawn) The method of claim 25, wherein said target is D-adenosine.

27-34. (Canceled)

35. (Withdrawn) The method of claim 15 wherein said human  $\alpha$ -thrombin is present in an amount of at least  $2 \times 10^{-15}$  mol.

36. (Withdrawn) The method of claim 17 wherein said D-adenosine is present in an amount of at least  $2 \times 10^{-14}$  mol.

37. (Withdrawn) The method of claim 24, wherein said human  $\alpha$ -thrombin is present in an amount of at least  $2 \times 10^{-15}$  mol.

38. (Withdrawn) The method of claim 26, wherein said D-adenosine is present in an amount of at least  $2 \times 10^{-14}$  mol.